## PMLevyCOLPEm Resource

**From:** Kitchen, Robert [Robert.Kitchen@duke-energy.com]
**Sent:** Tuesday, July 09, 2013 5:48 PM
**To:** Habib, Donald
**Cc:** Waters, David
**Subject:** Duke Energy Comments - ASER Chapter 20
**Attachments:** ASER Section 20 1 Comments (Seismic Hazard Evaluation).doc

Duke Energy has reviewed the Advanced Safety Evaluation Report (ASER) chapter 20 prepared for the LNP COLA. We have identified some items that we believe should be corrected in the Final Safety Evaluation Report (FSER). Duke Energy recommended changes are provided in the attached comment summary.

Please contact me at (919)-546-6992 if you have any questions regarding the recommended changes.

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Attachment 1

Duke Energy Comments for ASER Chapters 20

1. In Section 20.1.4.4 Ground Motion Response Spectra and Updated Cumulative Absolute Velocity Filter

   2nd Paragraph; change the following sentence to be consistent with the LNP FSAR subsection 2.5.2.7.4.2:

   From:

   "… The FSAR Figure 2.5.2-352 shows the results at the $10^{-3}$, $10^{-4}$, $10^{-5}$, and $10^{-6}$ annual exceedance frequencies at the GMRS elevation using CAV, where the spectra from the CEUS SSC model are higher than those using the updated EPRI-SOG model. The applicant stated that the higher motions are primarily cause by the modification to the CAV methodology."

   To:

   "… The FSAR Figure 2.5.2-352 shows the results at the $10^{-4}$, $10^{-5}$, and $10^{-6}$ annual exceedance frequencies at the GMRS elevation. The $10^{-4}$ and $10^{-5}$ UHRS based on the CEUS SSC model using modified CAV are higher than those using the updated EPRI-SOG model with full CAV. The applicant stated that the higher motions are primarily cause by the modification to the CAV methodology. For the $10^{-6}$ UHRS, the results based on the CEUS SSC model using modified CAV and those using the updated EPRI-SOG model with full CAV are similar for frequencies of 5 Hz and less and lower at higher spectral frequencies. The lower UHRS amplitudes at spectral frequencies above 5 Hz are due to difference in the rock hazard between the two models."

2. In Section 20.1.4.5 CEUS SSC Liquefaction Potential Evaluation

   1st Paragraph; change the following sentence to be consistent with the LNP FSAR subsection 2.5.4.8.7:

   From:

   "… the applicant stated that the PGA at finished elevation (the performance based soil response spectra (PBSRS) elevation of +51 ft. NAVD88) computed without CAV using the CEUS SSC model is 0.091g. This value is less than the 0.118g PGA from the design-basis liquefaction evaluations computed without CAV for the

$10^{-4}$ and $10^{-5}$ exceedance level input motions using the updated EPRI SOG model."

To:

"… the applicant stated that for the ground motion PGA at finished grade elevation (+51 ft. NAVD88) for the performance based surface response spectra (PBSRS) soil profile computed without CAV and using the CEUS SSC model is 0.091g. This value is less than the corresponding 0.118g PGA computed without CAV and using the updated EPRI SOG model."

3. Page 20-18 1st full paragraph last line correct 2.5.4.4.8 to 2.5.4.8

4. In Section 20.1.4.6.4 (page 20-20)

   1st paragraph correct 3.7.2.8 to 3.7.2.4

   2nd paragraph; change the following sentence to be consistent with the LNP FSAR Sections 2.5.4.10.1.1 and 3.7.2.4.1.7

   From:

   "… The applicant stated that the conceptual design of the RCC bridging mat for base shear, static bearing pressure, and dynamic bearing pressure are based on the AP1000 certified design documented in the generic site analyses in Revision 19 of the AP1000 design certification document (DCD)."

   To:

   "… The applicant stated that the conceptual design of the RCC bridging mat the conceptual design of the RCC bridging mat is based on a bearing pressure of 8.9 kips per square foot [ksf] for static loading and 24.0 ksf for dynamic loading. In addition, a base shear load of 136,000 kips based on the AP1000 a generic analyses was applied at the top of the RCC bridging mat. The static bearing pressure is based on DCD Revision 19 Tier 1 Table 5.0.1. The dynamic bearing pressure is the maximum subgrade pressure at the AP1000 basemat that results from the generic AP1000 analysis for soft rock sites."

5. In Section 20.1.4.6.4 RCC Bridging Mat Design

   1st Paragraph; change the following sentence to be consistent with the LNP FSAR subsection 2.5.4.5.4:
   From:

   "…The purpose of the RCC bridging mat is to transmit the nuclear island loads under static and dynamic conditions to the supporting karst foundation.

   To:

   "…The purpose of the RCC bridging mat is to replace the weakly cemented, undifferentiated Tertiary sediments that are present above elevation -7.3 m (-24 ft.) NAVD88, thereby, creating a uniform subsurface with increased bearing capacity; and to bridge conservatively postulated karst features

6. In "Section 20.1.4.6.6 (page 20-22)

   Change paragraph 4 to be consistent with the LNP FSAR Sections 2.5.4.10.1.1, 3.7.2.4.1.7, and 3.8.5.9

   From:

   "… The site-specific features, such as the RCC bridging mat and the drilled shaft foundations are designed to support seismic demands consistent with the AP1000 certified design demands, which exceed the site-specific demands at the LNP site with a substantial margin."

   To:

   "… The RCC bridging mat is designed (conceptual) to support seismic demands equal to or greater than the AP1000 generic seismic demand for soft rock sites, which exceed the site-specific demands at the LNP site. The drilled shaft foundations are designed (conceptual) for lateral seismic demand from site specific analysis and vertical seismic demand from the AP1000 generic analysis."

7. Section 20.1.4.7.2.1 Seismic Category I Structures (page 20-23)

   1st paragraph correct 3.7.2.8 to 3.7.2.4

Attachment 1

Duke Energy Comments for ASER Chapters 20

8. Section 20.1.4.7.2.1 Seismic Category I Structures

   1st Paragraph; change the following sentence to be consistent with the LNP FSAR subsection 2.5.4.5.4:

   From:

   "…The purpose of the RCC bridging mat is to transmit the nuclear island loads under static and dynamic conditions to the supporting karst foundation.

   To:

   "…The purpose of the RCC bridging mat is to replace the weakly cemented, undifferentiated Tertiary sediments that are present above elevation -7.3 m (-24 ft.) NAVD88, thereby, creating a uniform subsurface with increased bearing capacity; and to bridge conservatively postulated karst features."

9. Section 20.1.4.7.2.3 Liquefaction (page 20-24)

   3rd paragraph, last sentence change:

   From:

   "… The $10^{-5}$ UHRS envelops both 1.67 x GMRS …"

   To:

   "… The update EPRI-SOG plant finished grade $10^{-5}$ UHRS envelops both 1.67 x GMRS …"

10. Page 20-25 change first line to be consistent with FSAR section 2.5.4.8.6:

    From:

    "… northwest corner of the LNP Unit 2 turbine building."

    To:

    "… northwest corner of the LNP Unit 2 turbine building and in isolated pockets under the remaining LNP Units 1 and 2 footprints."

Attachment 1

Duke Energy Comments for ASER Chapters 20

11. Page 20-25 change 5th line to be consistent with FSAR section 2.5.4.8.6:

    From:

    "… The applicant concluded that analysis results based on $10^{-5}$ UHRS are the same as …"

    To:

    "… The applicant concluded that analysis results based on median centered liquefaction potential for updated EPRI-SOG $10^{-5}$ UHRS are the same as …"

12. Page 20-25 1st full paragraph 5h line from bottom to be consistent with FSAR section 2.5.4.8.5:

    From:

    "… The applicant will replace susceptible fill material with engineered fill and will install horizontal …."

    To:

    "… The applicant stated that for the area under the Annex, Turbine, and Radwaste building footprint, in-situ soil will be replaced or improved to a depth of approximately 2.1 m (7 ft.) below existing grade (elevation 12.8 m [42 ft.] NAVD88). The plant design grade will be established at elevation 15.5 m (51 ft.) NAVD88 by placing engineered fill above the improved / replaced in-situ material. In addition, the earthwork design incorporates horizontal …"